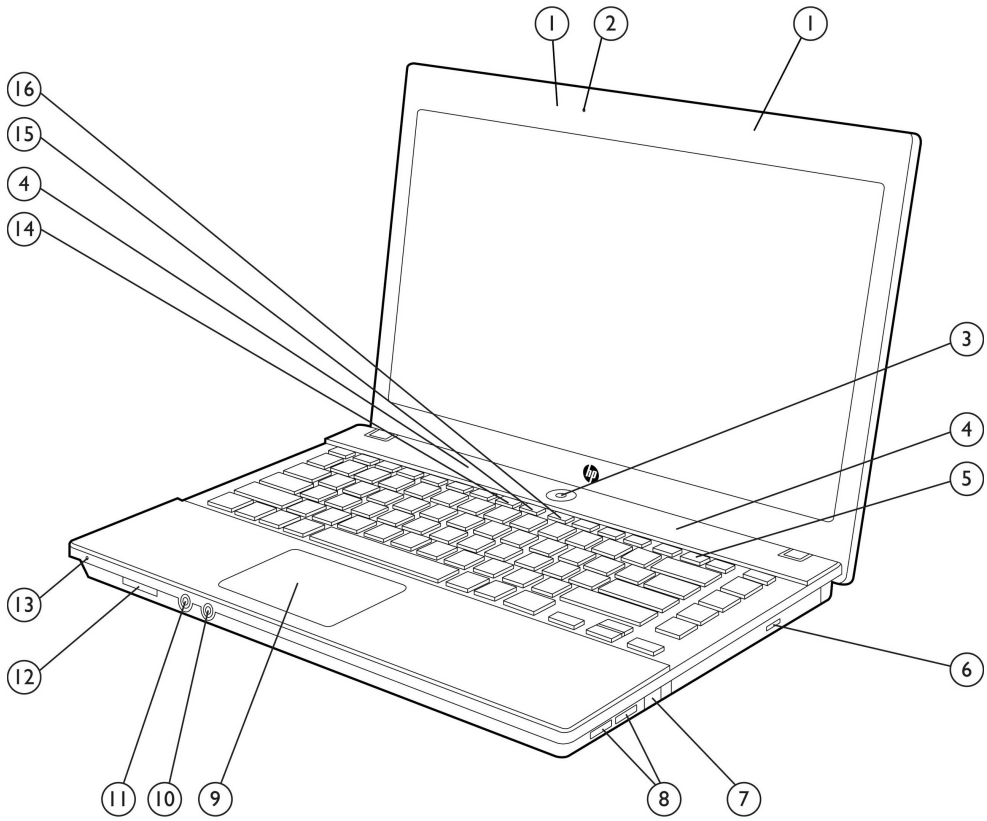
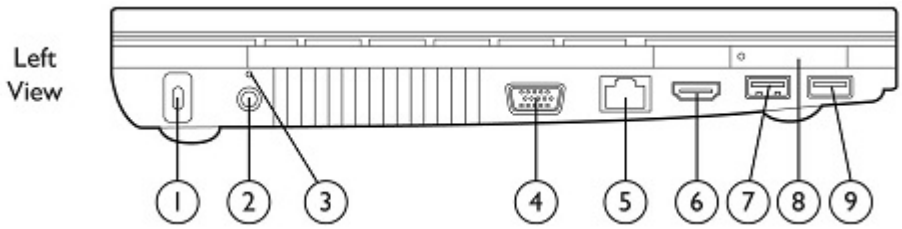
Overview

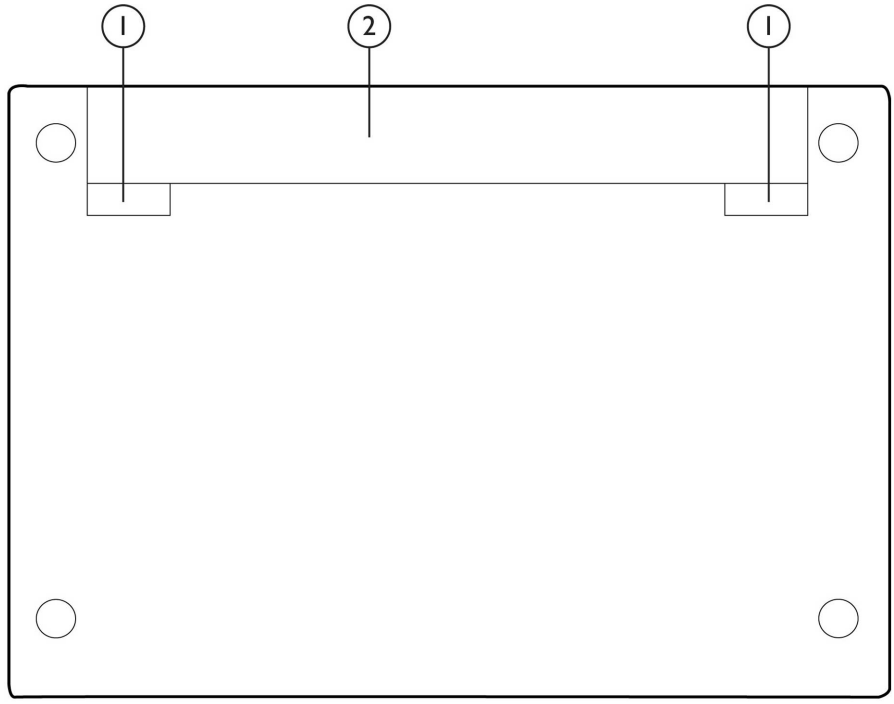


1. WLAN antennas
2. Integrated microphone
3. Power button with LED indicator
4. Stereo speakers
5. Wireless switch with LED indicator
6. Optical drive (select models)
7. Optional RJ-11/modem port
8. (2) USB 2.0 ports
9. ClickPad with left and right ClickPad buttons
10. Stereo microphone in
11. Stereo headphone/line out
12. Media Card Reader
13. Hard drive activity LED indicator
14. Volume mute button
15. Volume down button
16. Volume up button



1. Kensington Lock slot
2. Power connector
3. Battery charging LED indicator
4. VGA connector (external monitor/projector)
5. RJ-45/Ethernet port
6. HDMI port
7. eSATA/USB 2.0 combo port
8. ExpressCard/34 slot
9. USB 2.0 port

Overview



BottomView

1. Battery release latches
2. Battery bay

At A Glance

- Genuine Windows Embedded Standard 2009 or Genuine Windows Embedded Standard 7 featuring File Based Write Filter, Enhanced Write Filter, RDP 6.1, Internet Explorer 7, Windows Media Player 11
- Administrator control over read/write access to Solid State Module and USB attached memory devices
- 2 GB, 4 GB, or 8 GB Solid State Module for reliability, durability and increased battery life
- Thin, lightweight design starting at 4.27 lb/1.93 kg and 1.08 in/27.49 mm thin at front
- Full-sized spill-resistant keyboard, integrated ClickPad
- Widescreen 13.3-inch diagonal LED-backlit HD display with 16:9 aspect ratio
- HP Thin State Tools to configure thin clients via a USB flash drive or over the network
- HP Client Automation – Starter Edition and Altiris Deployment Solution for rich management options
- HP Device Manager to track, configure, upgrade, clone and manage hundreds or thousands of thin clients
- Choice of 9-cell battery for extended battery life or 6-cell battery for lighter weight
- VGA and HDMI ports for dual external-monitor support, including high-definition displays
- Integrated 802.11 a/b/g/n or b/g wireless connectivity
- Compatible with HP USB 2.0 Docking Station and HP Essential USB Port Replicator
- Integrated Media Card Reader
- Optional integrated DVD-ROM drive

Standard Features (availability may vary by country)

Processors	Intel Celeron P4500 Processor (1.8 GHz, 2 MB L3 cache)* NOTE: Processor speed denotes maximum performance mode; processors will run at lower speeds in battery optimization mode. * Intel's numbering is not a measurement of higher performance.	
Operating System	**Preinstalled**	Genuine Windows Embedded Standard 2009 Genuine Windows Embedded Standard 7
Chipset	Mobile Intel HM57 Express Chipset	
Graphics	Intel HD Graphics Microsoft DirectX 9 capable	
Display	**Internal**	13.3-inch diagonal LED-backlit HD anti-glare (1366 x 768 resolution) Optional HP Privacy Filter
	External	Up to 32-bit per pixel color depth VGA port supports resolutions up to 1600 x 1200 at 75 Hz, and lower resolutions at up to 100 Hz. HDMI port supports direct connection to high-definition displays with up to 1920 x 1080 resolution and 7-channel audio with one convenient cable (not included). NOTE: Resolutions are dependent upon monitor capability, and resolution and color depth settings.
Memory	**Standard**	DDR3 PC3-10600 SDRAM (1333 MHz)* Two SODIMM slots supporting dual-channel memory 1024 MB and 2048 MB SODIMMs Standard memory up to 4096 MB
	Dual-channel	Maximized dual-channel performance requires SODIMMs of the same size and speed in both memory slots.
	* Memory speed is processor dependent. NOTE: Due to the non-industry standard nature of some third-party memory modules, we recommend HP branded memory to ensure compatibility. If you mix memory speeds, the system will perform at the lower memory speed. Full availability of 4 GB or more of memory requires Windows Vista Business 64-bit or Linux. With Windows 32-bit operating systems, the amount of usable memory is dependent upon your configuration, so that above 3 GB all memory may not be available due to system resource requirements.	

Standard Features (availability may vary by country)

Communications	Realtek Ethernet (10/100/1000 NIC)*	
	Optional 56K V.92 modem**	
	* The term "10/100/1000" or "Gigabit" Ethernet indicates compliance with IEEE standard 802.3ab for Gigabit Ethernet, and does not connote actual operating speed of 1 Gb/s. For high-speed transmission, connection to a Gigabit Ethernet server and network infrastructure is required.	
	** Designed for downloads from 56K modem compliant sources. Maximum achievable download transmission rates currently do not reach 56 KB/s, and will vary with line conditions. Modem availability is subject to country regulatory approval.	
Wireless Devices	Secure, integrated wireless LAN options featuring support for the latest industry standards. Wireless LAN is factory configurable only.	
	All 802.11 integrated wireless LAN options	Wi-Fi certified Wired Equivalent Privacy (WEP) support up to 128-bit keys Wi-Fi Protected Access (WPA) and WPA2 support 802.1x authentication support, including EAP-TLS, EAP-TTLS, PEAP-GTC, PEAP-MSCHAPv2, and LEAP Advanced Encryption Standard (AES) support Dual antennas integrated in the display enclosure
	Broadcom 4322AGN 802.11a/b/g/n WiFi Adapter	Integrated support for 802.11a, b, g, and n Cisco Compatible Extensions support Up to 300 mbps data rate
	Broadcom 4312G 802.11b/g WiFi Adapter	Integrated support for 802.11 b and g Cisco Compatible Extensions support Up to 54 mbps data rate
Keyboard	The HP spill-resistant keyboard is designed using a Mylar film that minimizes the risk of damage to sensitive components underneath. The 101/102-key compatible keyboard features a full-pitch key layout with desktop keyboard features, such as the isolated inverted-T cursor control keys, editing keys, both left and right control and alt keys, and 12 function keys. US and International key layouts are available. Other features include hotkeys for instant access to power conservation and brightness, and 19.05 x 19.05 mm key pitch (center-to-center spacing).	
Pointing device	ClickPad with left and right ClickPad buttons	
Expansion card slots	**ExpressCard/34 slot**	Supports ExpressCard/34 (34 mm x 75 mm x 5 mm) card sizes
	Media Card Reader	Supports SD (Secure Digital), MMC (MultiMedia Card), Memory Stick, Memory Stick Pro, Memory Stick Duo*, xD-Picture card
	* Memory Stick Duo Adapters are required and sold separately. Inserting a Memory Stick Duo Card directly into your notebook could damage the memory card and/or notebook.	

Standard Features (availability may vary by country)

Storage	Internal Storage Device	2 GB, 4 GB, or 8 GB Solid State Module
	Optional Fixed Optical Drive	DVD-ROM Drive
Interfaces	VGA	One
	HDMI	One
	Stereo microphone in	One
	Stereo headphone/line out	One
	Power connector	One
	RJ-11/modem (optional)	One
	RJ-45/Ethernet	One
	Combo eSATA/USB 2.0	One
	USB 2.0	Three
	LED status indicators	Seven
Audio/Visual	HD audio (HP Premier Sound) support Integrated stereo speakers Integrated digital microphone Stereo headphone/line out Stereo microphone in	
Software (Preinstalled)		Enhanced Write Filter File Based Write Filter Internet Explorer 7 Windows Media Player 11 TeemTalk Emulation Symantec Endpoint Security Microsoft Remote Desktop Protocol (RDP) 6.1 Microsoft Firewall Citrix XenApp 11 VMWare View 4.0 WinDVD
	Manageability Solution	HP ThinState Tools HP Device Manager HP Client Automation Altiris Deployment Solution*
	Additional software available from the web	.NET Framework 2.0 Universal Print Driver (UPD) PDF Complete Citrix XenDesktop Broadcom Wireless Utility

* The Altiris Deployment Solution software is pre-installed but users must purchase a software license to activate the software. Visit www.symantec.com/business/deployment-solution to purchase a license to the Altiris Deployment Solution software.

Standard Features (availability may vary by country)

Security	Standard Features	Setup Password Power-On Password Kensington Lock Slot HP Privacy Filter (must be purchased separately)
Power Supply		External 65-watt Smart AC adapter 6-foot (1.8-meter) power cord included; total length including external AC adapter is 12 feet (3.66 meter) HP Fast Charge* * HP Fast Charge recharges your battery up to 90% within 90 minutes when the system is off. HP Fast Charge does not apply to the HP 9-cell battery.
Battery	Primary battery	HP 9-cell (93 WHr) Li-Ion battery HP 6-cell (47 WHr) Li-Ion battery
Battery Life	9-cell battery	Up to 7 hours and 45 minutes NOTE: Battery life will vary depending on the product model, configuration, loaded applications, features, use, wireless functionality and power management settings. The maximum capacity of the battery will naturally decrease with time and usage. See MobileMark07 battery benchmark http://www.bapco.com/products/mobilemark2005 for additional details.
System Standby Time		Up to 1 week
Power Conservation		Standby ACPI compliance
Docking		HP USB 2.0 Docking Station Uses a single USB cable to pass through video, audio, LAN, and USB signals. Allows easy connection of a monitor, mouse, external keyboard, printer, LAN cable, speakers and other accessories. Connect up to four concurrently working USB devices. HP Essential USB Port Replicator Uses a single USB cable to pass through audio, LAN, and USB signals. Allows easy connection of a mouse, external keyboard, printer, LAN cable, speakers and other accessories. Connect up to five concurrently working USB devices. NOTE: Some HP Docking stations may not support every feature of some HP Notebook models. Please refer to the individual docking station documentation for specific information about supported features.

Standard Features (availability may vary by country)

Service and Support	HP Services includes a one-year standard parts and labor warranty, pick-up or carry-in, and toll-free 7 x 24 hardware technical phone support (depending on model). Warranty upgrades are also available. HP Care Pack Services extend service contracts beyond the standard warranties. To choose the right level of service for your HP product, use the HP Care Pack Services Lookup Tool at: http://www.hp.com/go/lookuptool. Additional HP Care Pack Services information by product is available at: http://www.hp.com/hps/carepack. NOTE: Certain restrictions and exclusions apply. Consult the HP Customer Support Center for details. http://h20000.www2.hp.com/bizsupport/TechSupport/ProductRoot.jsp.

Options (availability may vary by country)

Memory	HP 1 GB (DDR3 1333 MHz) SODIMM	AT911AA
	HP 2 GB (DDR3 1333 MHz) SODIMM	AT912AA
	HP 4 GB (DDR3 1333 MHz) SODIMM	AT913AA
Storage	HP External USB CD/DVD R/RW Drive	FS943AA
Expansion	HP Basic Adjustable Stand	AL549AA
	HP USB 2.0 Docking Station	FQ834AA
	HP Essential USB 2.0 Port Replicator	AQ731AA
	HP Dual Hinge Notebook Stand	AW661AA
	HP Display & Notebook Stand	AW662AA
	HP Adjustable Display Stand	AW663AA
	HP Adjustable Dual Display Stand	AW664AA
Power	65W Smart AC Adapter	ED494AA
	90W Smart AC/Auto/Air Combo Adapter	AJ652AA
	HP Smart 65W Travel AC Adapter	AU155AA
	90W Smart AC Adapter	ED495AA
	HP 6-Cell Li-Ion Primary Battery	BQ350AA
Carrying Cases	HP Deluxe Nylon Backpack	RR317AA
	HP Value Nylon Case	RR314AA
	HP Universal Nylon Case	RR315AA
	HP Executive Leather Case	RR316AA
	HP Deluxe Roller Case	GD405AA
	HP Basic Backpack	AM863AA
	HP Basic Messenger	AP355AA
	HP Basic Carrying Case	AJ078AA
	HP Professional Series Carrying Case	AT886AA
	HP Professional Series Backpack	AT887AA
	HP Professional Series Messenger	AT888AA
	HP Professional Series Designer Tote	AT889AA
	HP Professional Series Slip Case	AT890AA
	HP Elite Series Designer Tote	AT891AA
	HP Elite Series Quick Case	AT892AA

Options (availability may vary by country)

Security	HP/Kensington MicroSaver Security Lock	PC766A
	HP Notebook Cable Lock	AY475AA
	HP Privacy Filter For 13.3 in	AU649AA
Input/Output Devices	HP USB/PS2 Optical 2-Button Scroll Mouse	DC369A
	HP USB Keyboard & Mouse Bundle	RC465AA
	HP USB Optical Travel Mouse	RH304AA
	HP Wireless Mouse	AR085AA
	HP Mobile Audio Speakers	FS944AA
	HP Mobile Productivity Bundle	AQ729AA
	HP Special Edition Optical Mouse	AU094AA

Memory

DDR3 PC3-10600 SDRAM (1333 MHz)*
Two SODIMM slots supporting dual-channel memory
SODIMM sizes supported: 1 GB, 2 GB, 4 GB

Standard Memory

- 1 GB (1 GB x 1)
- 2 GB (1 GB x 2)
- 2 GB (2 GB x 1)
- 3 GB (2 GB + 1 GB)
- 4 GB (2 GB x 2)

Optional Memory Upgrades

Support for up to 4 GB of memory with the installation of optional DDR3 SDRAM memory kits. Both memory slots are user accessible. Please refer to the Hardware and Software Guide for installation procedures. Maximized dual-channel performance requires SODIMMs of the same size and speed in both memory slots.

Up to	Slot 1	Slot 2
2 GB	1 GB	1 GB
2 GB	2 GB	--
3 GB	2 GB	1 GB
4 GB	2 GB	2 GB

NOTE: This chart does not represent all possible memory configurations. Due to the non-industry standard nature of some third-party memory modules, we strongly recommend using only HP branded memory modules to ensure compatibility. If you mix memory speeds, the system will perform at the lower memory speed. With Windows 32-bit operating systems, the amount of usable memory is dependent upon your configuration, so that above 3 GB all memory may not be available due to system resource requirements.

Memory Upgrades

HP 1 GB (DDR3 1333 MHz) SODIMM	AT911AA
HP 2 GB (DDR3 1333 MHz) SODIMM	AT912AA
HP 4 GB (DDR3 1333 MHz) SODIMM	AT913AA

Removable Media Drive Support

	Quantity Supported	Drive Bay
DVD-ROM Drive	One	Fixed optical drive bay

Internal Storage Device

	Quantity Supported	Drive Bay
Hard Drives		
2 GB Solid State Module	One	Hard Drive Bay
4 GB Solid State Module	One	Hard Drive Bay
8 GB Solid State Module	One	Hard Drive Bay

System Unit	**Dimensions** (HxWxD)	1.08 in (at front) x 12.74 in x 8.98 in 27.49 mm (at front) x 323.50 mm x 228.08 mm	
	Weight	Starting at 4.27 lb (1.93 kg) without optical drive or 4.58 lb (2.07 kg) with optical drive	
	NOTE: Height varies depending upon where on the notebook the measurement is made. Weight varies by configuration and components. Weight includes 6-cell battery, no optical drive. Weight varies by configuration and components.		
	Stand-Alone Power Requirements (AC Power)	Nominal Operating Voltage	18.5 V
		Average Operating Power	TBD W
		Max Operating Power	< 65W
	Temperature	Operating	32° to 95° F (0° to 35° C) (not writing optical) 41° to 95° F (5° to 35° C) (writing optical)
		Non-operating	-4° to 140° F (-20° to 60° C)
	Relative Humidity	Operating	10% to 90%, non-condensing
		Non-operating	5% to 95%, 101.6° F (38.7° C) maximum wet bulb temperature
	Shock	Operating	125 G, 2 ms, half-sine
		Non-operating	200 G, 2 ms, half-sine
	Random Vibration	Operating	0.75 grms
		Non-operating	1.50 grms
	Altitude (unpressurized)	Operating	–50 to 10,000 ft (–15.24 to 3,048 m)
		Non-operating	–50 to 40,000 ft (–15.24 to 12,192 m)
	Industry Standard Certifications	UL	Yes
		CSA	Yes
		FCC Compliance	Yes
		ENERGY STAR®	N/A
		EPEAT	N/A
		ICES	Yes
		Australia / NZ A-Tick Compliance	Yes
		CCC	Yes
		Japan VCCI Compliance	Yes
		MIC	Yes
		BSMI	Yes
		CE Marking Compliance	Yes
		Belarus	Yes
		CIT	Yes
		GOST	Yes
		Saudi Arabian Compliance (ICCP)	Yes
		SABS	Yes

		UKRSERTCOMPUTER	Yes

NOTE: For accessibility information on HP products, please visit: http://www.hp.com/accessibility.

HP 65W Smart AC Adapter	Dimensions	4.17 x 1.85 x 1.1 in (10.6 x 4.7 x 2.8 cm)	
	Weight	0.62 lb (280 g)	
	Input	100 to 240 VAC	
		Input Efficiency	87% min at 115 VAC
		Input frequency range	47 to 63 Hz
		Input AC current	1.7 A at 90 VAC, 0.85 A at 180 VAC
	Output	Output power	65W
		DC output	18.5V
		Hold-up time	5 msec at 115 VAC input
		Output current limit	<11A, Over voltage protection- 29V max automatic shutdown
	Connector	3 pin/grounded, mates with interchangeable cords	
	Environmental Design	Operating temperature	32° to 104° F (0° to 40° C)
		Non-operating (storage) temperature	–4° to 149° F (–20° to 65° C)
		Altitude	0 to 10,000 ft (0 to 3,048 m)
		Humidity	20% to 80%
		Storage Humidity	10% to 90%
	EMI and Safety Certifications	CE Mark – full compliance with LVD and EMC directives; Worldwide safety standards – IEC60950, EN60950, UL60950, Class1, SELV; Agency approvals – C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCC, NOM-1 NYCE; MTBF – over 200,000 hours at 25°C ambient condition.	

NOTE: Unless otherwise noted, temperature limits listed in the following component specifications relate to the internal temperatures of these components and not to the environment in which the PC is operating.

Technical Specifications

9-Cell (93 WHr) Lithium-Ion battery	Dimensions (HxWxL)	0.8 x 2.9 x 8.3 in (2.0 x 7.3 x 21.0 cm)	
	Weight	1.07 lb (0.488 kg)	
	Cells/Type	9-cell Lithium-Ion	
	Energy	Watt-hour Capacity	93 WHr
	Temperature	Operating (Charging)	32° to 113° F (0° to 45° C)
		Operating (Discharging)	14° to 140° F (–10° to 60° C)
		Non-operating	–4° to 140° F (–20° to 60° C)
	Battery Re-Charge Time	System in OFF Mode or Standby	3 to 4 hours
		System ON	4 to 6 hours (depending on system power consumption)
6-Cell (47 WHr) Lithium-Ion battery	Dimensions (HxWxL)	0.8 x 2.1 x 8.0 in (2.0 x 5.3 x 20.3 cm)	
	Weight	0.659 lb (0.299 kg)	
	Cells/Type	6-cell Lithium-Ion	
	Energy	Watt-hour Capacity	47 WHr
	Temperature	Operating (Charging)	32° to 113° F (0° to 45° C)
		Operating (Discharging)	14° to 140° F (–10° to 60° C)
		Non-operating	–4° to 140° F (–20° to 60° C)
	Battery Re-Charge Time	System in OFF Mode or Standby	2.5 hours
		System ON	3 to 5 hours (depending on system power consumption)
		HP Fast Charge Technology	Charges the battery up to 90% within 90 minutes when system is OFF
Displays			

Technical Specifications

13.3-inch LED HD (1366 x 768) anti-glare	Active Area (W x H)	11.53 x 6.49 in (29.3 x 16.5 cm)	
	Diagonal Size	13.3 in (33.8cm)	
	Surface Treatment	Anti-glare	
	Contrast Ratio	400:1 (typical)	
	Refresh Rate	60 Hz	
	Brightness	200 nit (typical)	
	Pixel Resolution	Pitch	0.215 mm
		Format	1366 x 768
		Configuration	RGB Stripe
	Backlight	LED	
	PPI	118 ppi	
	Viewing Angle	±30° Horizontal, ±10° Vertical (minimum) 30/30/20/10 (Left/Right/Down/Up) (minimum) or 45/45/35/25 (Left/Right/Down/Up) (typical)	

Internal Storage

2 GB Solid State Module (SSM)	Interface	SATA II, 3.0 Gbps
	Connector	7-pin SATA male connector 15-pin SATA power connector
	Capacities	2 GB
	Transfer mode	up to PIO mode-4, Multiword DMA mode-2, UDMA mode-5
	Sustained Read	up to 54 MB/sec
	Sustained Write	up to 33 MB/sec
	ECC Support	up to 8 bits correction per 512 bytes (BCH)
	Low Power Consumption (5.0V)	Active mode: 260 mA Idle mode: 120 mA
	Product types	Serial ATA 2.5
	Orientation	180D

Technical Specifications

4 GB Solid State Module (SSM)	**Interface**	SATA II, 3.0 Gbps
	Connector	7-pin SATA male connector 15-pin SATA power connector
	Capacities	4 GB
	Transfer mode	up to PIO mode-4, Multiword DMA mode-2, UDMA mode-5
	Sustained Read	up to 102 MB/sec
	Sustained Write	up to 55 MB/sec
	ECC Support	up to 8 bits correction per 512 bytes (BCH)
	Low Power Consumption (5.0V)	Active mode: 260 mA Idle mode: 120 mA
	Product types	Serial ATA 2.5
	Orientation	180D

Optical Drives

DVD-ROM Drive	**Access Times**	Random	< 140 ms CD (typical) < 160 ms DVD (typical)
	Max Data Transfer Rate	24X CD-ROM	Up to 3,600 KB/s
		8X-DVD	Up to 10,800 KB/s
	Transfer Mode	UDMA Mode 5	
	Interface	Gen 1 SATA	
	Supported Media (read)	CD-DA, CD+(E)G, CD-MIDI, CD-TEXT, CD-ROM, CD-ROM XA, MIXED MODE CD, CD-I, CD-I Bridge (Photo-CD, Video CD), Multisession CD (Photo-CD, CD-EXTRA, Portfolio, CD-R, CD-RW), CD-R, CD-RW, DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18), DVD-R, DVD-RW, DVD+R, DVD+RW, DVD-RAM	
	Supported Media (write)	None	
	Max Media Capacity (read)	8.5GB	
	Transport	Tray Loading	

Audio

Hardware	**Implementation**	IDT 92HD80 High Definition CODEC
	Keyboard hotkeys	Volume up, volume down, and mute Play, rewind, and fast-forward
	Full Duplex	Yes
	Microphone In	Stereo
	Headphone/Line Out	Stereo
	Integrated Microphone	Yes

Technical Specifications

Audio Output Quality	Frequency Response	20 Hz - 20 kHz
	Signal to Noise Ratio	>85 dB
	Total Harmonic Distortion	0.01%
	Noise Floor	-110 dB
	Play/Record Sampling Rate(s)	8 kHz - 48kHz
	DAC	16, 20 or 24-bit
	ADC	16 or 20-bit
Integrated Stereo Speakers	Power Rating	1.5 Watts
	Impedance	4 Ohms
Communications		
Integrated Realtek RTL8151DH-GR 10/100/1000 NIC	Ethernet Features	10 Mbit/s operation (10BASE-T; IEEE 802.3i; IEEE 802.3 clauses 13-14) 100 Mbit/s operation (100BASE-TX; IEEE 802.3u; IEEE 802.3 clauses 21-30) 1000 Mbit/s operation (1000BASE-T; IEEE 802.3z and 802.3ab; IEEE 802.3 clauses 34-42) Auto-Negotiation (Automatic Speed Selection) Full Duplex Operation at all Speeds, Half Duplex operation at 10 and 100 Mbit/s IEEE 802.1p QoS (Quality of Service) Support IEEE 802.1q VLAN support IEEE 802.3x Flow Control (IEEE 802.3 clauses 31-32; configurable)
	Power Management	ACPI compliant - multiple power modes Situation-sensitive features reduce power consumption Advanced link down power saving for reducing link down power consumption
	Performance Features	TCP/IP/UDP Checksum Offload (configurable) Large send offload and Giant send offload Receiving Side Scaling
	Manageability	Wake-on-LAN from standby and hibernation (Magic Packet and Microsoft Wake-Up Frame); Wake-on-LAN from off (Magic Packet only) PXE 2.1 Remote Boot Statistics Gathering (SNMP MIB II, Ethernet-like MIB, Ethernet MIB (802.3x, clause 30)) Comprehensive diagnostic and configuration software suite Virtual Cable Doctor for Ethernet cable status
	Interface	PCI Express 1.1 x1 to fully support ASPM L0s/L1 and CLKREQ
	NIC Device Driver Name	Realtek PCIe Gb Ethernet Family Controller

Technical Specifications

V.92 56K Data/Fax Modem	Form Factor	MDC 1.5 Daughtercard
	Power Management Support	APM Revision 1.2, ACPI
	Approvals/ Certifications	UL, CSA, NEMKO, CCIB, Industry Canada, FCC Part 68, CTR21, FCC Part 15 Class B, Canadian ICES-003 Class B, C.I.S.P.R.22, Australian ACA, CE Mark, Other Countries
	Data Mode Capabilities	V.92 data V.8bis V.80 V44, V.42bis, MNP5 (Compression) V.42 (LAPM, MNP2-4) (Error Correction) Optional symbol rates: 2800, 3429 Asymmetric Symbol rates Synchronous primary channel data signaling rates: 3600, 31200 Automatic rate re-negotiation V.34 V.32bis V.32 V.23 V.22bis V.22 V.21 Bell 212A Bell 103J
	Fax Mode Capabilities	TIA/EIA-578-B (Class 1) T.30, T.4 (Group 3) V.17 V.29 V.27ter V.21 Channel 2
	Command Set	V.250 (Partial) TIA-602 Identification: +GMI, +GMM, +GMR Port control: +IPR, +ICF, +IFC, +ILRR Modulation: +MS, +MR, +MA Error control: +ES, +ER, +EB, +ESR, +ETBM Data compression: +DS, +DR V.251
Broadcom 4322AGN 802.11a/b/g/n WiFi Adapter	Wireless LAN Standards	IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11n*

Technical Specifications

Interoperability	Wi-Fi certified (802.11abg only) Cisco Compatible Extensions Program compliant (802.11abg only) with Microsoft Windows Vista and XP (details at: http://www.hp.com/go/notebooks/WLAN)
Frequency Band	2.4 GHz and 5 GHz
Data Rates	802.11b: 1, 2, 5.5, 11 Mbps 802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11n: 6, 6.5, 9, 12, 13, 13.5, 18, 19.5, 24, 26, 27, 36, 39, 40.5, 48, 52, 54, 58.5, 65, 78, 81, 104, 108, 117, 121.5, 130, 135, 162, 216, 243, 270, 300 Mbps
Frequency Support	20 MHz: 2.4 GHz and 5 GHz bands 40 MHz: 2.4 GHz and 5 GHz bands
Modulation	Direct Sequence Spread Spectrum DBPSK, DQPSK, CCK, OFDM, BPSK, QPSK, 16-QAM, 64-QAM
Security[1]	Supports 64- and 128-bit WEP, WPA, WPA2, hardware-accelerated AES, 802.1x authentication types EAP-TLS, EAP-TTLS, PEAP-GTC, PEAP-MSCHAPv2, LEAP, EAP-FAST. Support for Cisco Security Features (proven compatibility with Cisco Aironet infrastructure products through the Cisco Compatible Extensions Program Version 4) with Microsoft Windows Vista and XP only.
Sub-channels	Multinational support with frequency bands and channels compliant to local regulations.
Media Access Protocol	CSMA/CA (Collision Avoidance) with ACK
Network Architecture Models	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)
Roaming	IEEE 802.11 compliant roaming between access points
Output Power (for CCK)[2]	17 dBm , nominal
Output Power (for OFDM; power varies by data rate)[2]	15 dBm , nominal
Power Consumption	Idle associated: 250 mW Idle unassociated: 150 mW Transmit/Receive 20 MHz channel: 2.0 W (max) Transmit/Receive 40 MHz channel: 2.0 W (max)
Power Management	ACPI compliant power management 802.11 compliant power saving mode
Receiver Sensitivity[3]	270 Mbps: -61dBm, , 54 Mbps: -72 dBm, 11 Mbps: -85 dBm , 1 Mbps: -92 dBm
Antenna type	High efficiency dual band antenna with spatial diversity, mounted in the display enclosure
Form Factor	PCI-Express Half-MiniCard
Weight	0.013 lb (6 g)
Dimensions	0.19 x 1.06 x 1.18 in (4.75 x 26.8 x 30 mm)
Operating Voltage	3.3v +/- 10%

Temperature	Operating Non-operating	14° to 149° F (-10° to 65° C) -40° to 176° F (-40° to 80° C)
Humidity	Operating Non-operating	10% to 90% (non-condensing) 5% to 95% (non-condensing)
Altitude	Operating Non-operating	0 to 10,000 ft (3,048 m) 0 to 50,000 ft (15,240 m)
LED Activity	LED Off - Radio OFF; Solid LED On - Radio ON	

1. Check latest software/driver release for updates on supported security features.
2. Maximum output power may vary by country according to local regulations.
3. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CCK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation).
4. WLAN supplier's client utility is required for Cisco Compatible Extensions support with Microsoft Windows XP. WLAN may also be compatible with certain third-party software supplicants. WLAN supplier IHV extensions required for Cisco Compatible Extensions support for Microsoft Windows Vista.

Broadcom 4312G 802.11b/g WiFi Adapter	**Wireless LAN Standards**	IEEE 802.11b IEEE 802.11g
	Interoperability	Wi-Fi certified Cisco Compatible Extensions Program compliantwith Microsoft Windows Vista and XP (details at: http://www.hp.com/go/notebooks/WLAN)
	Frequency Band	2.4 GHz
	Data Rates	802.11b: 1, 2, 5.5, 11 Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps
	Modulation	Direct Sequence Spread Spectrum DBPSK, DQPSK, CCK, OFDM
	Security[1]	Supports 64- and 128-bit WEP, WPA, WPA2, hardware-accelerated AES, 802.1x authentication types EAP-TLS, EAP-TTLS, PEAP-GTC, PEAP-MSCHAPv2, LEAP, EAP-FAST. Support for Cisco Security Features (proven compatibility with Cisco Aironet infrastructure products through the Cisco Compatible Extensions Program Version 4) with Microsoft Windows Vista and XP only.
	Sub-channels	Multinational support with frequency bands and channels compliant to local regulations.
	Media Access Protocol	CSMA/CA (Collision Avoidance) with ACK
	Network Architecture **Models**	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)
	Roaming	IEEE 802.11 compliant roaming between access points
	Output Power (for CCK)[2]	17 dBm , nominal
	Output Power (for OFDM; power varies by data rate)[2]	15 dBm , nominal

Power Consumption	Idle associated: 250 mW Idle unassociated: 150 mW Transmit: 2.0 W (max) Receive: 2.0 W (max)	
Power Management	ACPI compliant power management 802.11 compliant power saving mode	
Receiver Sensitivity[3]	54 Mbps: -71 dBm, 11 Mbps: -85 dBm , 1 Mbps: -95 dBm	
Antenna type	High efficiency dual band antenna with spatial diversity, mounted in the display enclosure	
Form Factor	PCI-Express Half-MiniCard	
Weight	0.013 lb (6 g)	
Dimensions	0.19 x 1.06 x 1.18 in (4.75 x 26.8 x 30 mm)	
Operating Voltage	3.3v +/- 10%	
Temperature	Operating Non-operating	14° to 149° F (-10° to 65° C) -40° to 176° F (-40° to 80° C)
Humidity	Operating Non-operating	10% to 90% (non-condensing) 5% to 95% (non-condensing)
Altitude	Operating Non-operating	0 to 10,000 ft (3,048 m) 0 to 50,000 ft (15,240 m)
LED Activity	LED Off - Radio OFF; Solid LED On - Radio ON	

1. Check latest software/driver release for updates on supported security features.
2. Maximum output power may vary by country according to local regulations.
3. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CCK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation).
4. WLAN supplier's client utility is required for Cisco Compatible Extensions support with Microsoft Windows XP. WLAN may also be compatible with certain third-party software supplicants. WLAN supplier IHV extensions required for Cisco Compatible Extensions support for Microsoft Windows Vista.

Eco Data

Eco-Label Certifications

This product has received or is in the process of being certified to the following approvals and may be labeled with one or more of these marks:

- IT ECO declaration

Energy Consumption	115 VAC	230 VAC	100 VAC
Normal Operation	10.141 W	10.939 W	10.159 W
Sleep (Energy Star low power mode)	0.55 W	0.67 W	0.51 W
Off	0.484 W	0.61 W	0.45 W

Heat Dissipation*	115 VAC	230 VAC	100 VAC
Normal Operation	35 BTU/hr	37 BTU/hr	35 BTU/hr
Sleep	2 BTU/hr	2 BTU/hr	2 BTU/hr
Off	2 BTU/hr	2 BTU/hr	2 BTU/hr

* Heat dissipation is calculated based on the measured watts, assuming the service level is attained for one hour.

Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)

System Fan Off	Sound Power (LWAd, bels)	Sound Pressure (LpAm, decibels)
Idle	1.5	24.2
Fixed Disk (random writes)	2.2	25.4

System fan is usually off except when charging the battery

Batteries

This battery(s) in this product complies with EU Directive 2006/66/EC

Batteries used in the product do not contain:

- Mercury greater the 5ppm by weight
- Cadmium greater than 10ppm by weight

The battery type and chemistry used in the product is:

- CR2032 (coin cell), Li-ion
- 6-cell high capacity Li Metal battery (optional 8 cell available)

Additional information:

This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive – 2002/95/EC.

This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive – 2002/96/EC.

This product is in compliance with California Proposition 65 (State of California; Safe Drinking Water and Toxic Enforcement Act of 1986).

Plastics parts weighing over 25 grams used in the product are marked per ISO 11469 and ISO1043.

This product contains 0% post-consumer recycled plastic (by wt.)

This product is greater than 90% recycle-able when properly disposed of at end of life.

Packaging Materials

- External:
  - Corrugated Carton – 412 g
  - Corrugated – 326 g
- Internal:
  - Molded Pulp – 150 g
  - Polyethylene low density – 20 g

- The Polyethylene low density packaging material is made from 85% recycled content.
- The Corrugated Carton packaging material is made from 85% recycled content.
- The Corrugated packaging material is made from 85% recycled

content.
- The Molded Pulp packaging material is made from 90% recycled content.

HP follows these guidelines to decrease the environmental impact of product packaging:

- Eliminate the use of heavy metals such as lead, chromium, mercury and cadmium in packaging materials.
- Eliminate the use of ozone-depleting substances (ODS) in packaging materials.
- Design packaging materials for ease of disassembly.
- Maximize the use of post-consumer recycled content materials in packaging materials.
- Use readily recyclable packaging materials such as paper and corrugated materials.
- Reduce size and weight of packages to improve transportation fuel efficiency.
- Plastic packaging materials are marked according to ISO 11469 and DIN 6120 standards.

Material Usage

This product does not contain any of the following substances in excess of regulatory limits (for reference of these limits please refer to the HP General Specification of the Environment (http://www.hp.com/hpinfo/globalcitizenship/environment/supplychain/gen_specifications.html):

- Asbestos
- Certain Azo Colorants
- Certain Brominated Flame Retardants – may not be used as flame retardants in plastics
- Cadmium
- Chlorinated Hydrocarbons
- Chlorinated Paraffins
- Formaldehyde
- Halogenated Diphenyl Methanes
- Lead carbonates and sulfates
- Lead and Lead compounds
- Mercuric Oxide Batteries
- Ozone Depleting Substances
- Polybrominated Biphenyls (PBBs)
- Polybrominated Biphenyl Ethers (PBBEs)
- Polybrominated Biphenyl Oxides (PBBOs)
- Polychlorinated Biphenyl (PCB)
- Polychlorinated Terphenyls (PCT)
- Polyvinyl Chloride (PVC) – except for wires and cables, and certain retail packaging has been voluntarily removed from most applications.
- Radioactive Substances
- Tributyl Tin (TBT), Triphenyl Tin (TPT), Tributyl Tin Oxide (TBTO)
- Nickel finishes that release greater than 0.5 micro-grams/cm ^ 2/week, measured according to EN 1811:1998, are not used on any product surface designed to be frequently handled or touched by users.

End-of-life Management and Recycling	Hewlett-Packard offers end-of-life HP product return and recycling programs in many geographic areas. To recycle your product, please go to: http://www.hp.com/go/reuse-recycle or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner. The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: http://www.hp.com/go/recyclers. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.
Hewlett-Packard Corporate Environmental Information	For more information about HP's commitment to the environment: Global Citizenship Report http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html Environment website http://www.hp.com/environment Eco-label certifications http://www.hp.com/hpinfo/globalcitizenship/environment/productdesign/ecolabels.html ISO 14001 certificates: http://www.hp.com/hpinfo/globalcitizenship/environment/operations/envmanagement.html

Copyright © 2011 Hewlett-Packard Development Company, L.P.

All rights reserved. Microsoft, Windows, and Windows XP are registered trademarks or trademarks of Microsoft Corporation in the U.S. and/or other countries. Intel and Celeron are registered trademarks or trademarks of Intel Corporation in the U.S. and/or other countries. All other product names mentioned herein may be trademarks of their respective companies.

The information contained herein is subject to change without notice and is provided "as is" without warranty of any kind. The warranties for HP products are set forth in the express limited warranty statements accompanying such products. Nothing herein should be construed as constituting an additional warranty. HP shall not be liable for technical or editorial errors or omissions contained herein.